

# Basic input and output

## Aim

In this laboration you should learn how to write a basic C++ program skeleton, how to produce output from the program to the user, and input from the user to the program (I/O for short).

Of special importance is to understand the I/O buffer. For this reason and other you are only allowed one variable of each type (`char`, `int`, `double`, `std::string`) and you are not allowed any control statements (`if`, `while`, `for`) you happen to know. You are expected to solve the assignment using only sequential instructions.

## Reading instructions

- Writing a program skeleton (main program)
- Compilation and running
- Using comments (`// C++ comment to end of line`, `/* C block comment */`)
- Including libraries (`#<include>`)
- Using the standard namespace (`using namespace std;` or `std::`)
- Data types (`int`, `char`, `float`, `double`, `std::string`)
- Literal types and escape sequences
- Variable declarations and assignment (`=`)
- Direct input (`istream::get`, `istream::ignore`, `std::getline`)
- Formatted input (`cin`, operator `>>`)
- Formatted output (`cout`, operator `<<`)
- Output manipulation (`<iomanip>` library)

## Assignment

Write a program that behaves as the program in example 1 on the next page. It is important to establish a good work process. Write an empty program skeleton that does nothing. Compile it. Run it. Add the first line of output. Compile and run. *Do as little as possible between each compilations and you will pinpoint errors much easier and faster.*

In the examples we have outlined text entered by the user in bold font. This is to help you distinguish user input from program output in the instruction only.

When you run your program you should test with different input and observe what happen. Also try different amount of space before or after input. Once your program work for example 1, with attention to details such as different kind of quotes and alignment, you move on to example 2. Your final program should handle both examples, and any similar example. You need however not handle the situation occurring when the program expect a number, but the user enter a string.

Remember you are limited to one variable each of `char`, `int`, `double` and `std::string`. You are not allowed any control statements.

Be careful if you paste text from the instruction. Special characters (for example quotes) tend to be in a special typesetting version not recognized by the compiler. We have instead a given file with most of the text prepared for you.

**Example 1**

Enter one integer: **123**  
You entered the number: 123

Enter four integers: **12 34 56 78**  
You entered the numbers: 12 34 56 78

Enter one integer and one real number: **4711 3.14159265**  
The real is: 3.142  
The integer is: 4711

Enter one real and one integer number: **2.71828183 1392**  
The real is: .....2.718  
The integer is: ....1392

Enter a character: a  
You entered: a

Enter a word: **Calvin**  
The word 'Calvin' has 6 character(s).

Enter an integer and a word: **32 students**  
You entered '32' and 'students'.

Enter an character and a word: **Q garden**  
You entered the string "garden" and the character 'Q'.

Enter a word and a real number: **three .14**  
You entered "three" and "0.140".

Enter a text-line: **The quick brown fox jumps over the lazy dog.**  
You entered: "The quick brown fox jumps over the lazy dog."

Enter a second line of text: **That was a pangram phrase.**  
You entered: 'That was a pangram phrase.'

Enter three words: **Testing One Two**  
You entered: 'Testing One Two'

**Example 2**

Enter one integer: **123.4**

You entered the number: 123

Enter four integers: **-12 100034 56 0**

You entered the numbers: -12 100034 56 0

Enter one integer and one real number: **4711**

**3.14159265 messing up**

The real is: 3.142

The integer is: 4711

Enter one real and one integer number: **1396 2.71828183**

The real is: ...1396.000

The integer is: .....2

Enter a character: **abcd**

You entered: a

Enter a word: **124calvin**

The word '124calvin' has 9 character(s).

Enter an integer and a word: **24students here**

You entered '24' and 'students'.

Enter an character and a word: **Qgarden 34**

You entered the string "garden" and the character 'Q'.

Enter a word and a real number: **three.14 16.17.18**

You entered "three.14" and "16.170".

Enter a text-line: **AND 1T D03S NOT rea11y matter.**

You entered: " AND 1T D03S NOT rea11y matter."

Enter a second line of text: **Frogs are green and Resistance is blue.**

You entered: ' Frogs are green and Resistance is blue."

Enter three words: **Testing One Two three.**

You entered: 'Testing One Two'